WHAT IS CLAIMED IS:

1. A radio communication apparatus that has first, second, third and fourth receiving antennas for receiving incoming radio waves, and carries out communication with mobile communication terminals, said radio communication apparatus comprising:

a received beam generating section for generating first and second received beams which are perpendicular to each other and spatially separated by assigning weights to received signals fed from the first, second, third and fourth receiving antennas by using first and second received beam weights utilizing Fourier transform;

a first path search section for measuring correlation between the first received beam fed from said received beam generating section and a known spreading code set for each of the individual mobile communication terminals, and for outputting path information when the first received beam includes a signal spread by the spreading code;

a second path search section for measuring correlation between the second received beam fed from said received beam generating section and a known spreading code set for each of the individual mobile communication terminals, and for outputting path information when the second received beam includes a signal spread by the spreading code; and

a demodulating section for receiving the first and second received beams from said received beam generating section, and for outputting demodulation data by performing RAKE combining in response to the path information fed from said first and second path search sections.

2. The radio communication apparatus according to claim 1, wherein said received beam generating section assigns weights to the received signals fed from the first, second, third and fourth receiving antennas using the first received beam weight of a fixed weight to generate a first received beam having a major lobe in a certain direction and a grating lobe in a direction 180 degrees opposite to the certain direction; and assigns weights to the received signals using the second received beam weight of a fixed weight to generate a second received beam which is orthogonal to the first received beam, and has a major lobe in a certain direction and a grating lobe in a direction 180 degrees opposite to the certain direction.

3. The radio communication apparatus according to claim 1, further comprising:

a feedback control section for outputting selection information by selecting a transmission beam to be transmitted in response to the path information fed from said first and second path search sections and to the phase difference between the first and second received beams fed from said demodulating section;

a plurality of spread modulating sections for receiving user data to be transmitted to the individual mobile communication terminals, and for outputting spread data of users by carrying out spreading processing using spreading codes, each of which is set for each of the individual mobile communication terminals;

a beam-by-beam multiplexing section for receiving the spread data of a plurality of users fed from said plurality of spread modulating sections, and for multiplexing the spread data

of the a plurality of users on a transmission beam-by-transmission beam basis in response to the selection information fed from said feedback control section;

a transmission beam generating section for receiving the spread data of the plurality of users passing through the multiplexing from said beam-by-beam multiplexing section, and for outputting weighted spread data of the plurality of users passing through the multiplexing by assigning weights using transmission beam weights; and

a transmission multiplexing section for receiving the weighted spread data of the plurality of users passing through the multiplexing fed from said transmission beam generating section, and for multiplexing the weighted spread data on an antenna-by-antenna basis of the first, second, third and fourth transmitting antennas.

4. The radio communication apparatus according to claim 3, wherein said feedback control section

outputs, when a receiving path is found in the first received beam in response to the path information fed from said first path search section, the selection information that enables a first transmission beam having directivity in a same direction as the first received beam;

outputs, when a receiving path is found in the second received beam in response to the path information fed from said second path search section, the selection information that enables a second transmission beam having directivity in a same direction as the second received beam;

outputs, when a receiving path is found in both the first and second received beams in response to the path information

fed from said first and second path search sections, and if phases of the receiving paths with a same delay in the first and second received beams have opposite phases, the selection information that enables a third transmission beam having directivity in a direction of opposite intersection points of the first and second received beams; and

outputs, when a receiving path is found in both the first and second received beams in response to the path information fed from said first and second path search sections, and if phases of the receiving paths with a same delay in the first and second received beams have a same phase, the selection information that enables a fourth transmission beam having directivity in a direction of opposite intersection points of the first and second received beams and in a direction shifted by 90 degrees from the third transmission beam.